Presented By Don Nelson Project Finance Director

Bison renewable Energy

"Energy from the country; for the Country"©

Bison Renewable Energy, LLC

Bison Renewable Energy LLC was formed in March 2006 for the purpose of developing, owning, and managing Biogas Regional Anaerobic Digesters (BRADs) in select locations in the US.

Funding was raised through a network of local investors from Iowa, Minnesota and South Dakota.

Mission Statement

To build and manage Ag BioSolid (ABS) fueled energy plants in rural locations utilizing integrated leading edge technologies to generate renewable sources of biogas (natural gas) while extending benefits to local communities through manure and waste management solutions and local economic development.

Renewable Energy

Through

Anaerobic Digestion

Anaerobic Digestion

Anaerobic digestion – a biological process that produces "biogas" which is principally composed of **65% methane** and 35% carbon dioxide.

Biogas is produced from organic waste (Ag BioSolids), common sources are; livestock manure, food processing wastes and other organic materials…*including energy crops.*

Anaerobic Digestion Design

"A little history"

Single Stage

Single Tank

Combined Phase Digestion

- Usually limited to one feedstock
- Increased possibility of instability
- Limitations on size and expansion
- Limited natural gas production
- Limited to farm-site systems
- Earliest generation of digestion

Two Stage

Two Tank

Separated Phase Digestion

- Allows for a mixture of feedstock
- Stability through separated stages
- Easily scaleable expansion
- Large scale natural gas production
- Regional commercial successes
- State-of-the-art digestion

Steps in Anaerobic Digestion

- Hydrolysis
- Acidogenesis
- Acetogenesis
- Methanogenesis

Steps in Anaerobic Digestion

Particulates solubilized and large polymers converted to simpler monomers

Simple monomers converted to volatile fatty acids

Volatile fatty acids converted to acetic acid, CO_2 and H_2

Acetate converted into CH_4 and CO_2 while H_2 consumed

Bison Technology

- German digester mainframe
- Two-stage digestion – U.S. developed – (GTI patent)
- Bison Energy process design
- Bison Energy "recipe" design - *based on available Ag BioSolids*
- State-of-the-art gas compression & cleaning pipeline insertion
- Wastewater treatment
- Separation strategies for "back-end" products
- Integrated systems and data collection

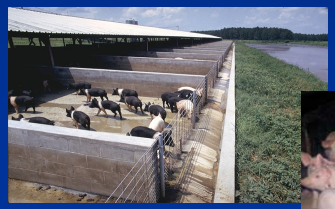
Ag BioSolids (ABS)

Digester Feedstock

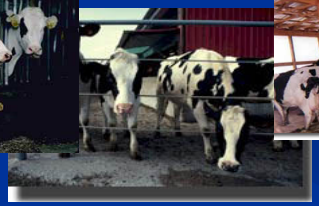
Ag BioSolids: *Animal Waste*

S O U R C E S

Swine






Dairy / Cattle

Feedlots







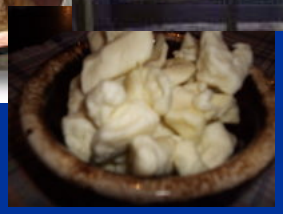
Poultry

Ag BioSolids: *Food Processing*

S O U R C E S

Meat Processing

Bakeries



Cheese

Fisheries

The BRAD

Biogas Regional Anaerobic Digester

The Cornerstone BRAD

Sioux County, IA

The Cornerstone BRAD

Digesters

Gas Train

Pipeline Insertion

Soil Amendment

BRAD *Products*

- **Pipeline Quality Natural Gas**
  - Methane = *natural gas, LNG, hydrogen, electricity*
- **Carbon Dioxide**
  - *For future capture and use – over-the-fence, greenhouse*
- **EPA 503A Pathogen-Free Compost**
  - *Organic soil amendment*
  - *Pathogen-Free Bedding*
- **Greenhouse Gas Credits**

Community Benefits

- Reduced odor due to farm-site collection
- Reduced odor due to an enclosed process
- Manure management solutions for large producers
- Waste solutions for organic waste producers
- Job creation – 50-75 jobs
- Interaction with local colleges and trade schools
- Over 2,500,000 in tax revenue to the community
- Local investment opportunities

Regional & National Benefits

- Significant generation of renewable energy
- Reduction of the release of methane
- A meaningful waste management solution
- Producer expansion potential
- A strategic partner in renewable energy growth

When fully supported nationally we can significantly reduce dependence on foreign oil.

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